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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,766	12/28/2001	Satoshi Shimizu	216780US-2 DIV	4292

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ALEXANDRIA, VA 22314

EXAMINER
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NGUYEN, CUONG QUANG

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/028,766	Applicant(s) SHIMIZU ET AL.	
	Examiner Cuong Q Nguyen	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 10-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10 and 11 is/are allowed.
- 6) ☒ Claim(s) 12 and 13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### **Claim Rejections - 35 USC § 103**

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shue et al. (US 5,744,395) in view of Mogami (US 5,656,519).

Shue et al. discloses a MIS transistor device comprising: a silicon substrate (1) having a main surface ; a gate insulating film (4) formed on the substrate ; a gate electrode (5) formed on the gate insulating film and having a silicified portion (11b) at an opposite side of the gate insulating film; a pair sidewalls formed on the main surface on both sides of the gate and having L-shape section (7); and impurity regions (source/drain regions 6, 9) formed inside the main surface to be opposite to the gate electrode, wherein impurity regions having silicified surfaces (11b). See Shue et al.'s Fig.7-8.

Shue et al. does not teach that the sidewalls are higher than the silicified portion of the gate electrode.

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Mogami discloses a MIS transistor comprising the sidewalls (9) formed on both sides of a gate electrode, wherein the sidewall is higher than a silicified portion (24a) of the gate electrode. See Mogami's Fig.2F.

It would have been obvious to one of ordinary skill in the art to form the sidewall being higher than the silicified portion of the gate electrode as taught by Mogami into Shue et al.'s device in order to prevent the short circuit between the gate electrode and the impurity regions. See Mogami's col.4 lines 33-40.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shue et al. in view of Mogami and further in view of Lur et al. (US 5,554,566).

The combination of Shue et al. and Mogami teaches all the limitations of claim 12 as shown above. However, this combination does not teach that a surface of the gate electrode being roughened.

Lur et al. discloses a transistor device comprises a surface (6B) of the gate electrode (4) having a roughened surface. See Lur et al.'s Fig.2.

It would have been obvious to one of ordinary skill in the art to incorporate the gate electrode having a roughened surface as taught by Lur et al. into the above combined device in order to improve the adhesion (reducing peeling phenomena) between the poly gate and the silicified portion of the gate electrode. This roughened surface also allows a less stress interface to be produced. See Lur et al.'s col.2 lines 1-8.

***Response to Arguments***

2. Applicant's arguments filed 7-13-04 have been fully considered but they are not persuasive.

Applicants argue that there is no motivation to combine the teaching of Mogami into Shue's device. In response, the motivation is clearly pointed out in the previous office action "It would have been obvious to one of ordinary skill in the art to form the sidewall being higher than the silicified portion of the gate electrode as taught by Mogami into Shue et al.'s device in order to prevent the short circuit between the gate electrode and the impurity regions. See Mogami's col.4 lines 33-40."

Applicants argue that Shue discloses that the short circuit already addressed in Shue's device such that the titanium is completely removed to prevent a bridging phenomena between the polycide structure and source/drain regions. So, there is no need for improving the short circuit with a the sidewall structure higher than the silicide portion of the gate electrode as taught by Mogami. In response, in the real world, the titanium can't be 100% completely removed So with the higher sidewall structure, the short circuit between gate electrode and the source/drain region can be better prevent.

Applicants argue that the sidewall structures of Shue's device and Mogami's device are different in shape, so they could not be combined to each other. In response, the only teaching of Mogami being incorporated in Shue's device is the height of the sidewall structure not the shape of the sidewall structure.

### **Allowable Subject Matter**

3. Claims 10-11 are allowed.

### **Conclusion**

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

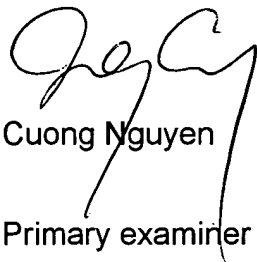
5. Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must

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conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 872-9306. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

6. Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to CUONG Q NGUYEN whose telephone number is (571) 272-1661. The Examiner is in the Office generally between the hours of 6:30 AM to 5:00 PM (Eastern Standard Time) Monday through Thursday.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Eddie Lee who can be reached on (571) 272-1732.



Cuong Nguyen  
Primary examiner

9/30/04